



## VOCABULARY TEACHING AND LEARNING ACROSS DISCIPLINES

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### In support of *This We Believe* characteristics:

- A shared vision that guides decisions
  - Students and teachers engaged in active learning
  - Curriculum that is relevant, challenging, integrative, and exploratory
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Middle level educators understand that vocabulary is at the heart of general language development and conceptual learning and is, therefore, a critical aspect of curricular programs in all disciplines at the middle school level. The extensive research base on vocabulary learning and teaching provides us with important guidelines that inform instruction (Harmon, Wood, & Hedrick, in press). In this research summary, we highlight relevant studies that support several key understandings of vocabulary learning and teaching. The following are six key understandings for all teachers across age levels and content areas.

- Word knowledge is important for learning.
- Word knowledge is complex.
- Metacognition is an important aspect of vocabulary learning.
- Effective vocabulary instruction moves beyond the definitional level of word meanings.
- Vocabulary learning occurs implicitly in classrooms across disciplines.
- Vocabulary learning occurs through direct instruction.

### Word knowledge is important for learning

Educators understand the importance of vocabulary, and few, if any, would omit vocabulary from their instruction. We know that a large vocabulary is an asset to readers; those who know many words are more likely to comprehend what they read. In fact, we have known for many decades that vocabulary size is a strong predictor of reading comprehension (Anderson & Freebody, 1981; Davis, 1944; Singer, 1965). However, the relationship between word knowledge and reading comprehension is complex and not easily described as one causing the other (Pearson, Heibert, & Kamil, 2007). Teaching unfamiliar words before students encounter them in a passage does not necessarily guarantee comprehension. Nonetheless, research indicates that there is a strong, positive, reciprocal relationship between word knowledge and reading comprehension (Baumann, Kameenui, & Ash, 2003; National Reading Panel, 2000; RAND Reading Study Group, 2002). That

is, vocabulary knowledge enables students to comprehend what they read, and the act of reading itself provides the opportunity for students to encounter and learn new words. Furthermore, the more words students know, the more likely they are to learn new words easily (Shafelbine, 1990). Conversely, students with limited vocabularies tend to read less and, therefore, have fewer exposures to new words in running text (Stanovich, 1986). Tremendous differences in word knowledge exist among students—differences that begin to appear at very young ages (Hart & Risley, 1995) and continue to impact learning as students move through school.

### Word knowledge is complex

The nature of vocabulary learning and acquisition is complex and involves several processes that can inform instruction. Nagy and Scott (2000) described five noteworthy components of word knowledge. First, they pointed out that word learning is incremental—that is, we learn word meanings gradually and internalize deeper meanings through successive encounters in a variety of contexts and through active engagement with the words. For example, the average tenth grader is likely to have a deeper and more sophisticated understanding of the term *atom* compared to the knowledge of an average fourth grader, who still has a more simplistic understanding of the term. We also know words at varying levels of familiarity from no knowledge to some knowledge to a complete and thorough knowledge, which serves us especially well in speaking and writing (Beck, Perfetti, & McKeown, 1982; Dale, 1965). It may be that, for some words, students may only need to have a general understanding of a term to keep comprehension intact. For other words, a deeper understanding may be necessary for students to successfully comprehend a passage.

Another aspect of word knowledge is the presence of polysemous or multiple meaning words. Many words have different meanings depending upon the context in which they are used. This is especially evident in the various content areas such as mathematics, where polysemous word meanings differ greatly from the common usage of words (Durkin & Shire, 1991; Wood & Harmon, 2008; Rubenstein & Thompson, 2002). For example, a common word such as *table* represents an entirely different meaning in science texts when authors discuss the *Periodic Table*.



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A third aspect of word knowledge described by Nagy and Scott (2000) is the different types of knowledge involved in knowing a word. The types of knowledge include the use of words in oral and written language, correct grammar usage of words or syntactical knowledge, semantic understandings such as appropriate synonyms and antonyms, and even morphological understandings that involve correct usage of prefixes and suffixes. Surprisingly, more than 60% of words encountered in academic texts can be taught morphologically (Nagy & Anderson, 1984). In particular, Milligan and Ruff (1990), in their analysis of social studies textbooks used from elementary through high school, found that approximately 71% of the glossary terms contained affixes and roots that could be directly taught.

A fourth aspect of word knowledge is the notion that learning a word meaning is inextricably related to knowledge of other related words. We do not learn word meanings in isolation; we learn word meanings in relation to other words and concepts. For example, knowing the concept of *rectangle* involves knowing about *polygons*, *quadrilaterals*, *right angles*, *squares*, and other related concepts. Finally, Nagy and Scott (2000) noted that word knowledge differs according to the type of word. Knowing the meaning of prepositions (e.g., *if*, *under*, *around*) differs greatly from knowing the meaning of specific science terminology, such as *nucleus*, *proton*, and *neutron*.

### **Metacognition is an important aspect of vocabulary learning**

Middle level students need to engage in metacognitive thinking about what they do and do not understand as they encounter unfamiliar vocabulary. With regard to word learning, metacognition goes beyond encounters with unknown words to include a more expanded awareness of vocabulary that enables learners to continually build and increase their vocabularies (Stahl & Nagy, 2006). According to Stahl and Nagy, word awareness is a critical aspect of a comprehensive vocabulary program and consists of two components: (1) the “generative” aspect of word learning that involves developing word consciousness, and (2) the acquisition of sufficient independent word learning strategies that are useful in learning words across a variety of texts and disciplines.

Described by Anderson and Nagy (1992) as an awareness and interest in word meanings, word consciousness allows learners to develop an appreciation of the power of words, an understanding of the importance of word choice, and an awareness of the differences between spoken and written language (Graves, 2006). Word consciousness is especially important for English language learners, who must be critically aware of figurative language, such as idioms, which makes word learning more challenging.

Teaching students independent word learning strategies is critical for supporting vocabulary growth and development.

Given the thousands of words students must learn to handle academic demands (Nagy & Anderson, 1984), direct instruction of vocabulary alone cannot shoulder the responsibility for increasing vocabulary knowledge. In fact, in their study of students in grades six through nine, Nagy and Anderson estimated that students in these grades may be exposed to 3,000 to 4,000 unfamiliar words while reading close to one million words in context during an academic school year (roughly 20 minutes per day). These numbers indicate that students also need to acquire word learning strategies for helping themselves figure out the meanings of words on their own (Graves, 2006). Two major independent word learning strategies are the use of context and morphology clues. While studies on the use of context clues as an independent and versatile strategy for word learning have been somewhat limited, and some even cautionary about the limitations of naturally occurring contexts (Baldwin & Schatz, 1985; Schatz & Baldwin, 1986), there is sufficient evidence to support instruction in context clues for helping middle grades students infer word meanings (Buikema & Graves, 1993; Jenkins, Matlock, & Slocum, 1989; Kuhn & Stahl, 1998; Patberg, Graves, & Stibbe, 1984). Other studies provide evidence that fourth, sixth, seventh, and eighth grade students can be taught to use morphological elements (i.e., prefixes, suffixes, roots) to infer word meanings in running text (Graves & Hammond, 1980; Wyssocki & Jenkins, 1987).

### **Effective vocabulary instruction moves beyond the definitional level of word meanings**

While the use of a dictionary for word learning is actually another independent word learning strategy, the ubiquitous practice of using dictionary definitions as an instructional technique has received much attention by researchers. The findings clearly indicate the limitations of this practice. Because definitions provide only a superficial level of word knowledge and rarely show students how to use the words, vocabulary instruction must move beyond the definitional level of word meanings. Miller and Gildea (1987) discussed the difficulties students have with using dictionary definitions to understand word meanings. They observed that their fifth and sixth grade participants searched for familiar ideas in the definitions and used that information to write their own sentences. For example, one student wrote, “I was *meticulous* about falling off the cliff” after reading the following definition for *meticulous*: “very careful or too particular about small details” (p. 99). The student focused on the phrase “very careful” and used that information for writing the sentence. Miller and Gildea found the same limitations when students were given an illustrative sentence containing a targeted word and were then asked to use that information to write a sentence. For example, for the illustrative sentence “The king’s brother tried to *usurp* the throne,” one student wrote, “The blue chair was *usurped* from the room” (p. 98). In this case, the student substituted the concept of “take” in the new sentence. From these



observations, Miller and Gildea argued that students learn words in what they call “intelligible contexts” where students perceive a need to know a word meaning and are motivated to pursue understanding.

Scott and Nagy (1997) found that using dictionaries as a source of word meanings was problematic for the fourth and sixth grade students in the study, especially in terms of correct usage. Similar to Miller and Gildea’s (1987) observation, students made what Scott and Nagy call “fragment selection errors,” using only familiar parts of the definition to determine word meaning. In conclusion, instruction that uses definitions alone is not likely to impact comprehension (Baumann et al., 2003).

### **Vocabulary learning occurs implicitly in classrooms across disciplines**

Vocabulary learning also occurs implicitly in language arts classrooms as well as content area classrooms, especially with regard to incidental word learning through context. Research studies have shown that upper grade students across ability levels can acquire vocabulary incidentally through reading and listening (Nagy & Herman, 1987; Sternberg, 1987). Nagy and Herman found that new words representing known concepts were more easily learned incidentally during independent reading than words that were more conceptually difficult. In another study, Swanburn and de Glopper (1999) found that middle level and secondary readers acquire partial understanding of approximately 15% of the unfamiliar words they encounter while reading. These studies support wide reading as an important component in a comprehensive vocabulary program. Reading widely and frequently is not only related to school achievement but also to increased vocabulary acquisition. In their study on the amount of time students spend reading, Anderson, Wilson, and Fielding (1988) found a positive correlation between the amount of time fifth grade students spend reading and their reading achievement scores on a standardized reading test. Students with scores at the 98th percentile on the test read approximately 5 million words per year, while those students scoring at the 50th percentile read approximately 600,000 words per year.

### **Vocabulary learning occurs through direct instruction**

A comprehensive, research-based program for supporting vocabulary learning includes the previously discussed topics of instruction on independent word learning strategies, an emphasis on word consciousness, and the importance of wide

reading. Direct instruction of specifically targeted words is also a critical component of an effective vocabulary program and has a solid research base. The well-known and widely accepted research of Beck, McKeown, and their colleagues (Beck, Perfitti, & McKeown, 1982; McKeown, Beck, Omanson, & Perfitti, 1983; McKeown, Beck, Omanson, & Pople, 1985) with upper elementary and middle grades students has shown that effective vocabulary instruction places an emphasis on the semantic relationship among words. In these studies, instruction moved beyond the definitional level to include activities for presenting words in semantic categories, using words in meaningful sentence contexts, and applying words in new contexts. Beck, McKeown, and their colleagues concluded that both word learning and comprehension were positively impacted by instruction that focused on the semantic relatedness of words; highlighted words central to passage understanding; and provided students with frequent, meaningful encounters with the words.

There are other studies on vocabulary instruction that focus on specific techniques for supporting word learning with young adolescents. For example, the keyword method, a mnemonic device, has a solid research base documenting its effectiveness for helping students remember word meanings (Levin, Levin, Glasman, & Nordwall, 1992; Pressley, Levine, & McDaniel, 1987; Pressley, Ross, Levin, & Ghatala, 1984). Studies also demonstrate that semantic maps to help students visualize the relationship among words are effective in promoting word learning (Johnson, Toms-Bronowski, & Pittelman, 1982 and Johnson, Pittelman, Toms-Bronowski, & Levin, 1984 as cited in Baumann et al., 2003). In addition, categorizing techniques, such as the Concept of Definition Map (Schwartz & Raphael 1985), as well as self-selection activities where students select words to learn (Ruddell & Shearer, 2002), are worthwhile teaching strategies for supporting vocabulary learning.

### **Conclusion**

This brief summary of vocabulary research highlights six basic key understandings that middle grades teachers in all content areas can use to inform their instruction. The research base on vocabulary is extensive and provides us with the direction we need to make critical decisions about how to help all students learn the vocabulary they need to acquire conceptual knowledge in the various subject matter disciplines.

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- Ruddell, M. R. & Shearer, B. A. (2002). "Extraordinary," "tremendous," "exhilarating," "magnificent": Middle school at-risk students become avid word learners with the Vocabulary Self-Collection Strategy (VSS). *Journal of Adolescent and Adult Literacy*, 45, 352–363.
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## ANNOTATED REFERENCES

Beck, I. L., McKeown, M. G., & Kucan, L. (2002). *Bringing words to life: Robust vocabulary instruction*. New York: Guilford.

This book expounds on the authors' concept of "robust" vocabulary instruction, advocating a teaching and learning process that provides students with meaningful, multiple exposures to words encouraging them to think and talk about words and their uses, share their understandings with others, and relate their vocabulary knowledge to overall comprehension. They frame their chapters with the premise that word knowledge falls along a continuum from a little or no knowledge to a qualitative dimension with a rich, deep, often metaphorical level of understanding. They give numerous illustrations through dialogue and examples of problems with prevalent practices, such as providing only dictionary definitions or rote memorization, and, instead, tell how to develop student-friendly explanations of word meanings, use deductive questioning, paraphrase information to aid in comprehension, and assess students' conceptual word knowledge. The authors recommend an instructional sequence appropriate for all grade levels from the primary, intermediate, middle, and high school level and for all disciplines.



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Blachowicz, C. L. Z., Fisher, P. J. L., & Ogle, D. (2006). Vocabulary: Questions from the classroom. *Reading Research Quarterly*, 4, 524–539.

This article begins with a historical perspective on vocabulary knowledge and instruction and then goes to the field to pose questions teachers have about vocabulary teaching and learning. The article concludes with recommendations for moving ahead as a community of researchers and teachers interested in this most important topic. One of the many significant findings of this article, as well as the one on assessment by Pearson described next, is that we have had little change related to vocabulary development in classroom practice or in our commercial programs over the past several years. The authors back up the questions teachers have about vocabulary with evidence from the professional literature. The questions asked by teachers include issues such as determining which words to teach, approaches for assisting ELL students, bridging the early learning vocabulary gap, how technology can be used effectively, and what we know about how to assess students' vocabulary knowledge.

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Pearson, P. D., Hiebert, E. H. & Kamil, M. L. (2007). Vocabulary assessment: What we know and what we need to learn. *Reading Research Quarterly*, 42, 282–296.

The major premise of this “theory and research into practice” contribution is that educators' vocabulary measures are inadequate and not sufficiently sensitive in illustrating the relationship between vocabulary knowledge and general measures of comprehension. The authors address three questions: What do our current and past vocabulary assessments measure? What could they measure? What research needs to be done to ensure that our methods of teaching, learning, and assessing vocabulary knowledge are valid? They conclude that much research is yet to be undertaken in the area of vocabulary assessment. Among the many research questions identified, is the need to differentiate the type of vocabulary instruction required by various text genres given that we typically present vocabulary instructional principles holistically. Since our assessment of vocabulary knowledge has not changed dramatically through the decades, the authors also suggest that computerized assessment of vocabulary knowledge be implemented to determine students' understanding of specific domains of interest (from common morphemes to terms for a particular discipline).

## RECOMMENDED RESOURCES

Allen, J. (1999). *Words, words, words: Teaching vocabulary in grades 4–12*. York, ME: Stenhouse.

Allen, J. (2007). *Inside words: Tools for teaching academic vocabulary Grades 4–12*. Portland, ME: Stenhouse.

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